

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:	)	
Orlowski, David C. et al.	)	
Serial No.: 09/428,982	)	Examiner: Patel, Vishal A.
Filed: 10/28/1999	)	
For: Bearing Isolator	)	Art Unit: 3676

**DECLARATION OF NEIL F. HOEHLE**

**I. Background of Declarant:**

1. I, Neil F. Hoehle, declare as follows under penalty of perjury.
2. I am the Vice-President of Operations for Inpro/Seal Company an Illinois corporation located in Rock Island, Illinois. (hereinafter referred to as the "Company")
3. The Company manufacturing facility is located in Rock Island, Illinois. The facility currently produces large numbers of bearing isolators for sale in the industry.
4. I have over 25 years experience in the development, engineering, manufacture and marketing of products for pumps, particularly those related to pump seals, bearings and bearing isolators.
5. I am listed as an inventor or co-inventor on three patents in the field of bearing isolators and shaft seal assemblies as listed below:
  - a. US #7,090,403 for "Articulated seal";
  - b. US #6,062,568 for "Bearing isolator with air purge";
  - c. US #5,174,583 for "Unitary bearing seal";
6. I consider myself to be skilled in the arts as related to the improved bearing isolator subject of the present patent application based on both my previous and present experience.

**II. Prior Art Fails to Teach the Present Art**

7. I have read and I am familiar with the patent application #09,428,982 as filed on October 28, 1999.
8. I have read and I am familiar with the office action issued on October 20, 2006.
9. I have read and studied the prior art cited by the examiner in support of the 102(b) novelty rejection including U.S. Patent #5,221,095 issued to Orlowski (hereinafter "Orlowski").
10. I have also read and studied the prior art cited by the examiner in support of the 103(a) obvious rejection including U.S. Patent #5,431,414 issued to Fedorovich et al. (hereinafter "Fedorovich").
11. The references relied on by the examiner do not, in fact, teach one of ordinary skill in the art what the examiner opines they teach.
12. The labyrinth type seal as taught in Orlowski has a shallow conical groove in the stator facing the shaft and is referred to as a "catchment groove 30" as quoted below:

To collect lubricating fluids and inhibit their passage down the shaft 13, an annular fluid catchment groove 30 can be formed in the interior of the stator 20. The illustrated groove 30 is provided with a first or downstream face 32 oriented generally perpendicularly to the axis A of the shaft 13, and a second opposed face 34 which is conical in shape. This groove configuration has been found to be effective in collecting oil or other fluids which may flow along the surface of the shaft 13 in a direction leading from the interior I of the equipment housing towards the exterior environment E. A return or drain groove 36 located at the bottom of the stator 20 is sloped toward the shaft axis and collects the accumulated oil or other fluid and encourages its return to the interior bottom of the housing 12.

Orlowski, Col. 3, lines 52-62.

13. The labyrinth type seal as taught in Fedorovich also has a shallow conical groove in the stator facing the shaft and is referred to as either a "first annular groove 34" or a "second annular groove 36" as quoted below:

In operation, lubricating oil traveling outwardly along the surface of the shaft 22 past the first ridge 28 is rotated by the rotating shaft 22 and thrown by centrifugal force into the first annular groove 34. The oil then falls by gravity into the axial groove 38 and is thereby directed back into the housing 18. Oil that makes its way past the first groove 34 and past the second ridge 30 is thrown by

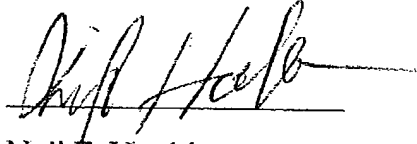
centrifugal force into the second groove 36 and then drained by gravity into the axial groove 38 to be directed back into the housing 18. Thus, the stator member 12 and the rotating shaft 22 work together dynamically to prevent oil from escaping out of the housing 18.

Fedorovich, Col. 3, line 57-Col. 4, line 8.

14. Testing conducted by Declarant of designs similar to those disclosed in Orlowski and Fedorovich indicated lube oil turbulence induced by shaft rotation created a lube oil bubble, which inhibited effective drainage through the slots of the shallow conical or annular grooves as taught by either Orlowski or Federovich. *See* enclosed supporting Exhibits 1-2.
15. Increasing both the size of the deep annular groove and the distance of the lubricant from the rotating shaft significantly improved the performance of the invention over the tested seal which is similar to the designs found in Orlowski and Fedorovich.
16. Declarant's testing determined that the shallow depth of the conical or annular grooves (referenced as 30 by Orlowski and 34 or 36 by Fedorovich) limited drainage and allowed for shaft contact with the lube oil bubble thereby insuring shaft seal leakage.
17. Placement of a deep annular groove sized to be as wide and deep as allowable by the materials chosen for the stator, and positioned to face the shaft, reduced lubricant turbulence thereby increasing seal efficacy. *See* Exhibit 3.
18. I am not aware of any references or publications teaching or suggesting that lube oil turbulence induced by shaft rotation created a lube oil bubble, which could inhibit effective drainage through the slots of the conical or annular grooves.
19. The size and position of the conical or annular grooves were not considered result effective variables by either Orlowski or Federovich prior to the testing carried out.
20. The size and position of the conical or annular grooves were not considered result effective variables by Declarant prior to the testing carried out.

21. One of ordinary skill in the art, not having access to this testing, would not have had a reasonable expectation of success in combining the references suggested by the examiner.
22. Because the size and position of the deep annular groove were not considered result effective variables prior to testing, a person of ordinary skill in the art, in view of the Orlowski reference or the combination of Orlowski and Federovich references, would not have determined the size and position of the deep annular groove through routine testing to reduce the effect of turbulence on the lube oil to reduce seal leakage and improve seal efficacy.
23. Because the Orlowski and Federovich references do not teach or suggest the problem solved by applicant nor anticipate the range of applicant's solution, the §102 rejection should be withdrawn.
24. Because the Orlowski and Federovich references in combination do not teach, suggest or indicate motivation for one of ordinary skill in the art to solve the problem of the present art, the Examiner has not met the burden required for a prima facie case obvious case, and the obvious rejection should be withdrawn and the present application allowed to issue as a patent.

I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the trademark application.

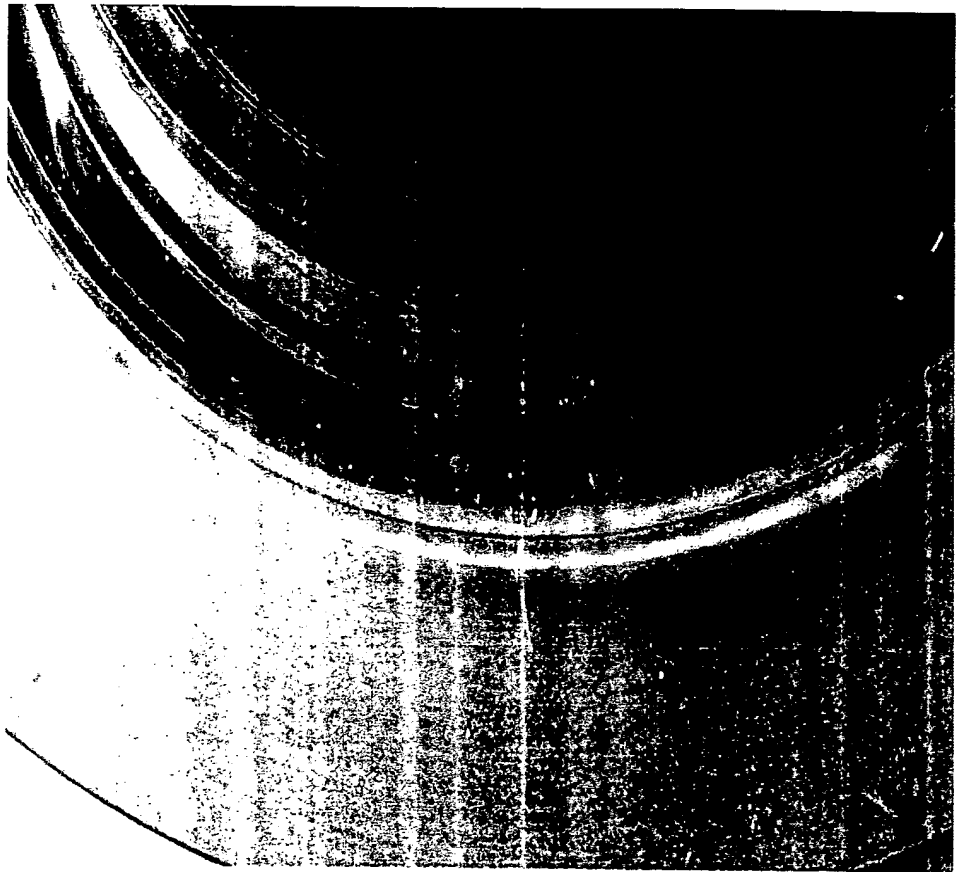
A handwritten signature in black ink, appearing to read "Neil F. Hoehle", is written over a horizontal line.

Neil F. Hoehle

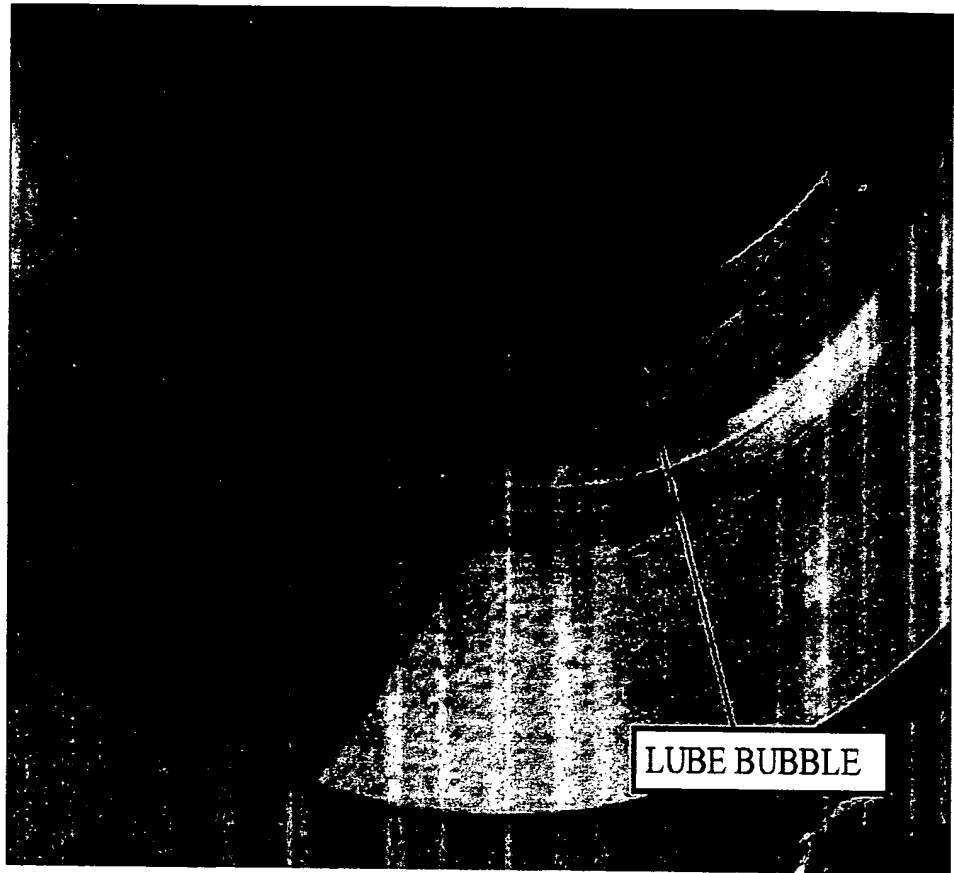
Inpro/Seal Company

Vice President Operations

Rock Island, Illinois



**Exhibit 1: Lube Bubble Formation**



**Exhibit 2: Lube Oil Bubble Formation**

# **EXHIBIT 3** **Lube Retention Capabilities of Elliott Turbine Isolators T0001 and T0002 Series** **For AYR, BYR, CYR and DYR Turbines**

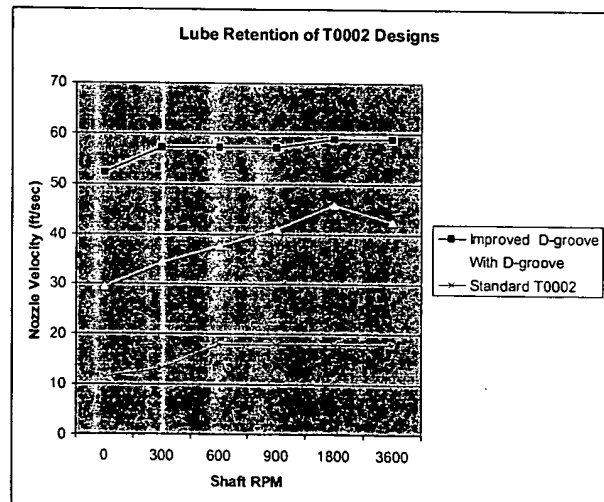
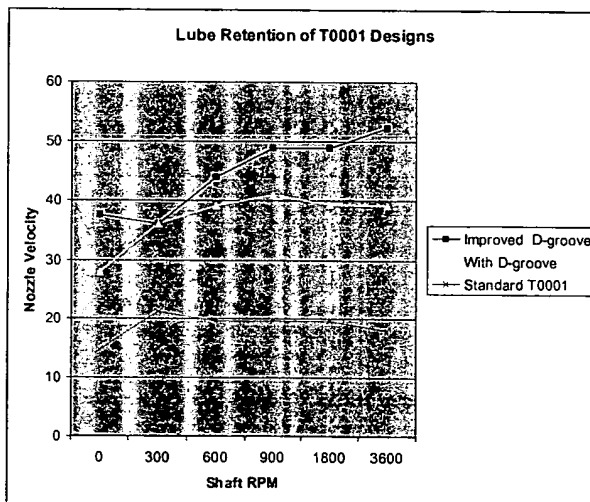
**Neil Hoehle**  
**Inpro/Seal Company**

Lubricant retention capability is measured by subjecting the inboard side of each Isolator to a continuous spray of lubricant through two ¼" diameter jet nozzles at several listed shaft speeds. Nozzle velocity of the lubricant is varied at each shaft speed until first leakage is observed.

The charts below show results for 3 designs each of the T0001 and T0002 series of Bearing Isolators. Both charts illustrate the relationship between shaft rpm and the nozzle velocity at which leakage is first observed. Higher values for lubricant leakage, represented by the vertical axis, indicate the Isolator is more resistant to direct spray.



**Lube Spray Evaluation**



Results indicate that for both Isolators, the D-groove option provided a significant increase in resistance to direct high velocity lube spray. Performance was further significantly enhanced by the improved D-groove design. Given that approximately ½ of all turbines in service use a quiet sump and ½ use a forced feed lube system, this increase in lube retention performance has significant practical consequences.